



## **Team training**

The STS-79 astronauts spend many hours preparing for their mission. Photos on Page 3.



### Earned value

Mission Operations Directorate's contractors earn Certificates of Validation. Photos on Page 4.

# Space News Roundup

## Galileo finds changes on Jupiter's moon

A new image of Jupiter's volcanically active moon lo, returned by NASA's Galileo spacecraft, shows that significant changes have occurred on the moon since lo was observed 17 years ago by the exploratory NASA spacecraft Voyagers 1 and 2.

"The changes we are seeing on lo are dramatic," said Galileo camera team leader Michael Belton of the National Optical Astronomical Observatories in Tucson, Ariz. lo's landscape undergoes constant change due to numerous sulfur volcanoes that continually erupt across its mottled orange and white face, he said. "The colors of material on the ground and their distribution have changed substantially since the Voyager flybys of 1979."

One of the most striking changes noted in the image are new deposits of sulfur and sulfur dioxide frost deposited from the volcano Masubi in lo's southern hemisphere. "The sulfur dioxide gas that drives the volcano makes a big plume, condenses, then paints the surface white," Belton said. Masubi was discovered as an active volcano during the Voyager encounters of lo.

Galileo's first color image of lo was taken June 25 at a range of 1.4 million miles during the spacecraft's approach to Jupiter's largest moon, Ganymede. The smallest features that can be discerned in the new image of lo are approximately 14 miles in

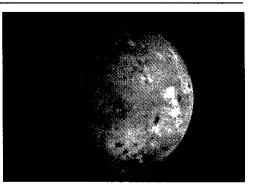
size, a resolution comparable to the best Voyager images of the same face of lo.

Galileo promises to return new views of volcanic activity on lo throughout the spacecraft's remaining 17-month mission orbiting Jupiter. Higher resolution images of lo will be taken in coming months.

Launched in October 1989, Galileo entered orbit around Jupiter on Dec. 7. 1995. The spacecraft's mission is to conduct detailed studies of the giant planet, its largest moons and the Jovian magnetic environment.

More information on the Galileo mission is available on line at URL:

http://www.jpl.nasa.gov/galileo



The mottled face of Jupiter's volcanically active moon lo, viewed by the camera onboard NASA's Galileo spacecraft, shows dramatic changes since it was seen 17 years ago by the exploratory NASA spacecraft Voyagers 1 and 2.

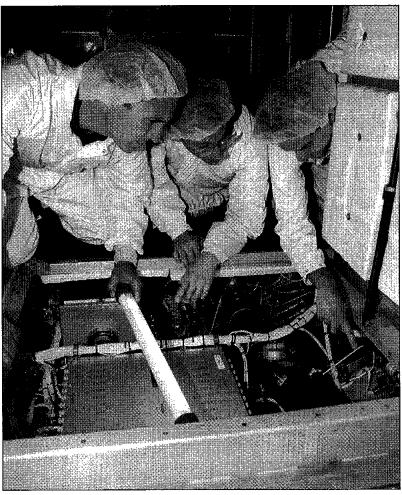
## Chamber team shares memories

The four JSC volunteers who spent 30 days sealed in a special, air-tight chamber in Bldg. 7 as part of the Advanced Life Support Early Human Testing Initiative will share memories with employees, family and friends Wednesday in Teague Auditorium.

Test Team Lead Doug Ming, Lead Engineer John Lewis, Lead Electrician Pat O'Rear and Thermal Systems Expert Katy Hurlbert will discuss living inside the three-story 20-foot diameter chamber recycling air and water during their stay. Two additional tests are planned for 1997, a 60-day and 90-day test, with the latter using both plants and physiochemical means for recycling air and water.

In addition to the briefing by the crew, JSC Director George Abbey and Engineering Director Leonard Nicholson will recognize key individuals and groups who contributed to the success of the Regenerative Life Support Program and discuss future plans for extended duration testing.

The invitation is being broadened to include not only JSC employees, but their friends and family members and off-site contractors and their guests. Visitors are encouraged to use JSC Gate 2 (in front of Bldg. 1



From left, STS-79 Mission Specialists Carl Walz and Jay Apt check out the layout of the double Spacehab module with Chris Jaskola of McDonnel Douglas. The double module configuration will be flown for the first time on STS-79, allowing for more room for experiments and supplies for the Russian Mir Space Station. This is one of the many training requirements the astronauts perform before a mission. For

## **Atlantis** awaits new solid rocket boosters in VAB

**ATLANTIS** 

The change out of Atlantis' solid and external tank. rocket boosters continues to go smoothly as engineers prepare to mate the orbiter in the next few

Atlantis remains in the Vehicle Assembly Bldg. at Kennedy Space Center and engineers completed and John Blaha is scheduled for

leak checks and joint close-out work on the new left booster mid-week. Work began Wednesday to stack the right booster segments. Booster stacking operations are expected to be completed Monday and engineers will then begin work to mate the boosters to the external tank Tuesday. On Wednesday, technicians

will demate Atlantis' boosters to prepare the orbiter for its new set of boosters.

Atlantis is scheduled to roll from the VAB to the Orbiter Processing Facility Aug. 13 to await the completion of the mating of the boosters to the external tank. The orbiter will then roll back to the VAB to be mated with the new set of boosters

Roll out to KSC's Launch Pad 39A is scheduled for Aug. 20 and a final dress rehearsal of the launch countdown with Commander Bill Readdy, Pilot Terry Wilcutt, Mission Specialists Tom Akers, Jay Apt, Carl Walz Aug. 27 and 28.

The tentative launch date of Sept. 12 is set for the fourth docking to the Russian Mir Station. The nine-day mission will retrieve Astronaut Shannon Lucid from Mir and drop off Blaha who will begin a four-month stay on the Russian outpost. Blaha will join the Mir 22 crew-

Commander Gennady Manakov, Flight Engineer Pavel Vinogradov and French Cosmonaut Researcher Claudie Andre-Deschays.

During the mission, Atlantis' astronauts and the Mir cosmonauts will focus on a variety of microgravity and life science experiments in the Spacehab double module—the first Please see **DISCOVERY**, Page 4

## Lucid writes home about space walking protocol

er Shannon Lucid recently sent a letter nome from the Russian Mir Space Station as the crew begins to wrap up its science work in anticipation of the journey home to Earth. The following is the text of her letter.)

Dear Everybody,

Another week, another EVA-or at least that is what it seems like right now here on the space station Mir. Yuri and Yuri have just finished their fourth EVA in less than three weeks and are busy at this very moment getting ready for their fifth. There may even be a sixth. Even by Russian standards, that is a lot. Their fourth EVA was done on their 100th day in space. In answer to your question, no, it is not a routine, business as usual activity; there is a very real sense of anticipation that steadily increases as the EVA time approaches and peaks during the actual event. We have, though, established a certain working pattern preparing for these EVAs.

Several days in advance, Yuri and Yuri check out their spacesuits. Spacesuits are left here on Mir and used over and over; each crew person adjusts the size to fit himself. When a problem develops that can't be repaired by a crew person, the suit is replaced. The suit that Yuri is currently using has been used for more than 13 EVAs. After

wiring or telemetry are made. It yuri and yuri are taking a payload out, it is positioned in the airlock. Yuri and Yuri then spend some time looking over procedures and discussing, what they will be doing. Then, they gather together all the tools they'll be using and fasten them onto their tool tray.

Because of our current orbits, we don't have much communication coverage during our day, so all the EVAs have been done in the middle of the night. On the day of an EVA, we get up a little later than usual. After breakfast, Yuri and Yuri check their spacesuits again and the ground looks at telemetry to make certain that everything is in good shape. We have a quick lunch and then a rest period. And yes, we really do fall asleep; when the lights are turned off in a module, it is really dark and

you just go to sleep. After getting up, we wait until time to go out the hatch. Yuri and Yuri put on their white undergarments that have tubes sewn in the body, the head and the upper legs and arms. These tubes are for circulating water to cool the cosmonauts while they are doing the EVA. At this point in time there is very little communication capability with mission control,

before time to enter the natch, Yuri takes a big piece of red tape and puts it across the communication controls that I am absolutely not to touch while they are outside. He did this for the first EVA and the tape has now become a "tradition" that signals it is time to leave. I think that if I were the commander

leaving a foreigner in my spacecraft all alone, I would wrap the entire place up in red tape.

The Russians have a tradition of everyone sitting quietly and collecting their thoughts before they begin a trip or start a new activity. That is what we do just before they leave for the airlock. We sit quietly together for a few minutes in the base block. Then Yuri says let's go, and both Yuris fly, literally, over my head like two white geese headed south.

They exit the base block with a wave and they are off to the airlock. A few minutes later, I hear the airlock clang shut, and there I am, all alone in the space station.

the station pressure is, what part of the world

(Editors note: Mir 21 Cosmonaut Research- the suits are checked out, any changes in so we are pretty much on our own. Just we are flying over, what time the next communication pass will be, or what I am doing Finally, I hear them exiting the airlock and leaving the station. I was taken totally by surprise the first time this happened because it seemed that, no sooner were they out of the airlock, than Yuri was yelling at me to look out the window and start taking pictures. I looked out and there was my commander perched on the end of a very long white pole arcing over the blue and white earth below. Because the station is so big, this pole is used to transport a crew person and payload from one segment to another. It is manually moved by the other crew person. My first thought when I saw this was, "Wow, the future is now. This is real space station work." For a number of years now, I have been seeing artist renditions of what it would be like when the International Space Station is being worked on in a routine manner by astronauts, but this was no artistic fantasy; this was real life. This was the "future" being played out in real time, and I was getting to have a small part in it. How could one person be so fortunate?

Unfortunately, Mir is big and the windows are relatively few, so I can only see bits and pieces of the EVA. After one EVA, when Yuri and Yuri were looking at the video I had taken, they asked why I only photographed

Please see LUCID, Page 4



Communication is very good between the crew people here on Mir, so I hear all the preparations that are going on as they are getting the airlock ready for depressurization. Every once in a while, they will ask me what

## Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

Houston Astros vs San Francisco Giants: 7 p.m. Aug. 3 at the Astrodome. Field box tick-

Houston Astros vs St. Louis Cardinals: 7 p.m. Aug. 25 at the Astrodome. Mezzanine tick-

Lovin Feelings Concert: 7 p.m. Sept. 28 at the Summit. Tickets cost \$37.

EAA Mexico Copper Canyon Train Trip: Nov. 6-12, \$995 per person, \$200 deposit required, final payment due Sept. 6.

Sam Houston Race Park: \$10 value pack for \$5.25, includes Club Level seating, program, tip sheet, admission, preferred parking and gift shop discount. **Splashtown**: One day pass cost \$14.25.

Schiltterbahn: One day pass cost \$19.75 for adults, \$16.95 for children. Astroworld: One day pass cost \$22.75, two day pass cost \$34.25.

Fiesta Texas: One day pass cost \$22.75, two day pass cost \$34.25.

Six Flags at Arlington: One day pass cost \$22.75, two day pass cost \$34.25. Sea World: Adult tickets cost \$24.50, children (3-11) cost \$17.25.

Space Center Houston: Discount tickets, adult, \$8.75; children (4-11), \$6.25, annual mem-

bership, \$22.95, family membership, \$59.95. Movie discounts: General Cinema, \$4.75; AMC Theater, \$4.50; Sony Loew's Theater,

Stamps: Book of 20, \$6,40. JSC history: Suddenly, Tomorrow Came: A History of the Johnson Space Center. Cost is

Metro tickets: Passes, books and single tickets available.

Special Event: Splashtown NASA Family Days are Aug. 9-18. Tickets are on sale through Aug. 7, good for one day only and cost \$9.95.

## **Gilruth Center News**

Sign up policy: All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a NASA badge or yellow EAA dependent badge. Classes tend to fill up two weeks in advance. Payment must be made in full, in exact change or by check, at the time of registration. No registration will be taken by telephone. For more information, call x30304

EAA badges: Dependents and spouses may apply for photo identification badges from 7:30 a.m.-9 p.m. Monday-Friday; and 8 a.m.-4 p.m. Saturdays. Dependents must be between 16 and 23 years old.

Fitness Challenge: 1996 Fitness Challenge runs to Aug. 31. Employees are eligible to win \$100 gift certificates. For more information call Larry Wier at x30301.

Defensive driving: One day course is offered once a month. Cost is \$25. Interested employees should call the Gilruth.

Stamp club: Meets at 7 p.m. every 2nd and 4th Monday in Rm. 216.

Women's self defense: Martial Arts training for women only from 5-6 p.m. Tuesdays and Wednesdays. Cost is \$25 a month.

Weight safety: Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. Aug. 12. Pre-registration is required. Cost is \$5.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays

Aikido: Martial arts class meets from 6:15-7:15 p.m. Tuesday and Wednesday. Cost is \$25 per

month. New classes begin first of each month.

Aerobics: Class meets from 5:15-6:15 p.m. Monday, Tuesday and Thursday.

Ballroom dancing: Cost is \$60 per couple. For additional information call the Gilruth Center at

Country and Western dancing: Beginner class meets 7-8:30 p.m. Monday. Advance class meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

Fitness program: Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at

## Dates & Data

Today

Cafeteria menu: Special: baked meatloaf. Total Health: baked potato. Entrees: chicken fajitas, ham steak, pork and beef eggrolls, steamed fish, Reuben sandwich. Soup: seafood gumbo. Vegetables: stewed tomatoes, seasoned spinach, cut corn, macaroni and cheese.

Monday

Radio club meets: The JSC Amateur Radio Club will meet at noon Aug. 29 in Bldg. 16 Rm. 253. For more information call Larry Dietrich at x39198.

Cafeteria menu: Special: Italian cutlet. Total Health: roast beef au jus. Entrees: chicken a la king, enchiladas with chili, vegetable lasagna, steamed pollock, French dip sandwich. Soup: split pea and ham. Vegetables: Brussels sprouts, oriental vegetables, buttered carrots, lima beans.

#### **Tuesday**

Cafeteria menu: Special: stuffed cabbage rolls. Total Health: roasted turkey. Entrees: turkey and dressing, country style steak and hash browns, beef ravioli, baked chicken, fried cod fish. Soup: tomato Florentine. Vegetables: Italian blend, okra and tomatoes, corn cobbette, navy beans.

Wednesday

Toastmasters meet: The Spaceland Toastmasters will meet at 7 a.m. July 31 at the House of Prayer Lutheran Church. For more information call Jeannette Kirinich

Astronomy seminar: The JSC Astronomy Seminar will meet at noon July 31 in Bldg. 31, Rm. 129. An open discussion meeting is planned. For more information call Al Jackson at x35037.

Cabaret show: The Employee Activities Association presents "Cabaret" at 8 p.m. Aug. 17 at the

1894 Grand Opera House, Galveston. Tickets cost \$23 and are on sale at the Bldg. 11 Exchange store through July 31.

Cafeteria menu: Special: pepper steak. Total Health: stir fry pork with rice. Entrees: liver and onions, stirfry pork with rice, steamed fish, western special, Reuben sandwich. Vegetables: steamed broccoli, yellow squash, macaroni and cheese, vegetable sticks.

Thursday

Warning system test: The sitewide Employee Warning System will under go its monthly audio test at noon Aug. 1. For more information call Bob Gaffney at x34249.

Cafeteria menu: Special: chicken fried steak. Total Health: baked potato. Entrees: beef tacos, steamed pollock, baked chicken, catfish special. Soup: navy bean. Vegetables: spinach, cut corn, breaded okra, pinto beans.

Cafeteria menu: Special: tuna noodle casserole. Total Health: baked potato. Entrees: steamed salmon steak, baked chicken, fried cod fish, ham steak. Soup: seafood gumbo. Vegetables: French cut green beans, green peas, blackeyed peas, cauliflower with cheese.

Aug. 6

ABWA meets: The American Business Women's Association, Clear Lake Area Chapter will meet at 5:30 p.m. Aug. 6 at Bay Oaks Country Club. For more information call Nancy Hutchins at x34006.

Aug. 8

Airplane club meets: The Radio Control Airplane Club will meet at 7:30 p.m. Aug. 8 at the Clear Lake Park Community Bldg. For more information call Bill Langdoc at

x35970.

Aug. 9

Astronomers meet: The JSC Astronomical Society will meet at 7:30 p.m. Aug. 9 at the Lunar & Planetary Institute 3600 Bay Area Blvd. For more information call Chuck Shaw at x35416.

Aug. 13

BAAC meets: The Bay Area Aero Club will meet at 7 p.m. Aug. 13 at the Houston Gulf Airport in League City. For more information call Jerry Adair at x38058.

Aug. 14

MAES meets: The Society of Mexican American Engineers and Scientists will meet at 11:30 a.m. Aug. 14 in the Bldg. 3 Cafeteria executive dining room. For more information call Michael Ruiz at x38169.

Aug. 15

Directors meet: The Space Family Education board of Directors will meet at 11:30 a.m. Aug. 15 in Bldg. 45 Rm. 712D. For more information on this open meeting call Gretchen Thomas at x37664.

Aug. 21

Scuba club meets: The Lunarfins will meet at 7:30 p.m. Aug. 21 at Redfish Restaurant under the Kemah/Seabrook Bridge, Seabrook Side. For more information call Fred Toole at x33201.

Aug. 22

NĀSA open forum: NASA will conduct an open forum meeting to solicit responses concerning NASA's procurement policies and practices from 2-4 p.m. Aug. 22 at the Teague Auditorium. For more information call the JSC Industry Assistance Office at x34511.

JSC

## <u>wap Shop</u>

**Property** 

Sale: Townhome/duplex, 2-2.5-1G +CP, FPL, deck, new water heater/disposal, D/W, new paint exterior, assum FHA, \$63k, 488-2716.

Lease: Meadowgreen, 3-2-2, new carpet, 1800 sq ft. avail 8/1, \$950 mo. 244-0124 or 480-9436.

Sale: Nassau Bay, 4-2.5-2, FPL, new paint and kitchen, spa/deck, landscaped, \$126.9k. 335-1378. Sale: Pearland, 4-3.5-2, 2760 sq ft, \$117,850. 489-

Sale: El Dorado Trace condo, 2-1- W/D, sec sys, cov'd parking, pool, storage room. 286-7014. Sale: Egret Bay condo. 1-1, W/D, FPL, new carpet.

cov'd parking, \$29.9k. 339-2306. Sale: LC, 3-2-2, avail 7/1, new roof, lg yard, near NASA, cul-de-sac, \$55k. James, 386-1934. Lease: Univ Trace condo, 1 + study, 1 1/3 baths,

W/D, \$520 mo. x39541 or 480-2417. Lease: Univ Trace condo, 2-2, refrig, non-smoking, no pets, W/D conn, FPL, \$550 mo. 480-1340.

Lease: CLC, Oakbrook, fen, 4-2.5-2, formals, no smokers/pets. \$1.250 mo. Jack Cohen, 488-3171 Lease: CLC, University Trace, townhouse, 2-2.5,

A/C, FPL, refrig, W/D conn, x34698 or 286-7541. Rent: West Galveston Bay house, 3-2, sleeps 8, all conven, wkend/wkly rates, no pets. 488-4412.

Sale: Heritage Park, 3-2-2, brick 2-story home, by owner, below appraisal, \$77.5k, 482-8845. Sale: Lake Conroe resort, all facilities, yr round activi-

ties, charter membership, \$1,975, 326-5150 Sale: Woodville, TX, lakefront home, 3-2.5-2 + quest

quarters, C A/H, FPL, deck, pier/bulkhead, .5 ac lot, \$124.5k 484-8030 Lease: LC, Meadow Bend, 3-2-2, W/D, refrig, fence,

avail 8/1, \$925 mo + dep. 538-1724 or 409-948-0247. Rent: Lake Livingston lakefront home, 2-2, sleeps 6, furn, \$115 dly, \$600 wkly. 335-1378.

#### Cars & Trucks

'86 Honda Prelude Si, red/black, sunroof, auto, A/C, tinted, alarm, AM/FM/cass, new tires/paint, good cond, \$3.3k obo. Lisa, x40213 or 992-7302

'89 Ford Probe GT Turbo, 5 spd, loaded, alarm, great cond, \$4.5k. Tiffiny, x31888 or 643-2210. '93 Ford Aerostar XLT van, Eddie Bauer inter, ex

cond, \$10k. Donna, x30261 or 334-5082. '77 Pontiac Grand Prix, T-top, blue, needs paint,

AM/FM, work car, \$650. x48838 or 935-4862. '89 5251 BMW, blk w/tan leather inter, sunroof,

alarm, \$11.5k obo. Ginger, 326-2535 or 834-2804. '93 Chevy Custom van, blk, loaded, ext warr. \$13.5k

'93 Jeep Wrangler, Sahara edition, 47k mi, alarm, \$13.5k. Josh, 488-4182. '87 240DL Volvo wagon, great cond, AM/FM, CD.

489-3845 '79 El Camino, fair shape, work car, A/C. Jimmy, 337-5583

'85 Pontiac Grand Prix, 305 V8, auto, loaded, A/C. pwr, 2 tone grey, 1 owner. Mary Helen, 333-2859 or 333-6478. '91 Honda CRX SI, white w/blk inter, pwr, new

clutch/batt, 5 spd, sunroof, AM/FM/cass, A/C, runs great, 78k mi, \$6.4k. 331-8521. '75 T-bird, wht w/wht leather 80k mi, V8 P/S P/R P/W, P/L, AM/FM, CB radio, radar detector, new tires, \$2.5k. 282-3570 or 474-3820.

'88 Dodge Aries K, 4 dr, new hoses/batt/radiator, \$1.5k obo. Greg, x34391 or 335-8098

'75 914 Porsche Targa, blk w/blk inter, \$3.5k. Marilyn, 280-5962 or 486-4270.

'90 Eagle Talon Tsi turbo, loaded, CD/cass, alarm, ex cond, \$8k. Ryan, x34474 or 286-7971. '84 Corvette, auto, removable top, silver, good cond. \$7.5k. 333-9113.

'88 Pontiac LeMans, 4 dr, 5 spd, new brakes/tires/ batt/trans, \$3k. 282-4418 or 286-4681

'95 Ford F150 XL pickup, ex cond, warranty, 10k mi, \$14.5k. x32264 or 488-2184. '84 BMW 318i, 5 spd, sunroof, white, good cond,

A/C, \$3,850 obo. x35590 or 991-0821 '82 Pontiac J2000, good cond, good work or teen

car, \$750 obo. x47326 or 486-9673. '78 Datsun 280Z, 5 spd, new muffler/tires, runs good, \$1.6k. x38785.

'89 Pontiac Lemans, silver, 5 spd, AM/FM/cass, A/C, \$2k. Joe, x38851 or 488-1750. '82 Chevy S10 pickup, needs engine & A/C work, new carb, starter, good tires, batt, trans, radio, body, \$500 obo. 244-0249 or 488-5166.

'89 Chevy S-10, red, runs good, needs work, 73k mi, std, \$1.2k obo. Sherman, 337-2590

'89 Jeep Cherokee 4.0, red/grey, auto, A/C, alloy wheels, \$7.2k. x47114 or 326-3375. '83 Dodge Ram van, depend, full sz, custom inter,

no A/C. \$1.4k. Ken. x31496, 286-7583 ord Mustang LX convert V8. loaded, red, good

cond, 90k mi, garaged, \$8,950. x32515. '91 Chevy S10 PU, A/C, P/B, AM/FM/cass, ex cond, 38k mi, \$6.3k. Richard, 282-4404 or 474-5842. '95 Trans AM, red, 6 spd, loaded, 14k mi, \$19.5k

obo. Bob, x32386 or 480-9370. '84 Nissan 300ZX, 5 spd, T-tops, dk gray, new tires/A/C, fuel inject, 115k mi, \$2,950 obo. Nelson,

x48591 or 334-1008. '91 Alfa Romeo 164L, grn/tan leather, 85k mi, records incl, price nego. Rhonda, 750-1312.

### **Boats & Planes**

18' Gulf Coast sail boat, extra sails, trailer, good shape, cabin sleeps 2, 6 person deck, \$1.5k. 282-4404 or 474-5842.

84 Kawasaki 550 LTD, 5.4k mi, 6 spd, shaft drive, garaged, \$1.25k, 286-5816

Kastan Pro XL BMX racing bike, chrome-molly frame, Technique cranks, Odyssey pedals w/crupie cages, Kevlar racing seat, helmet, leathers, jersey, gloves, \$500 nego. Keith, x38739 or 534-3279. Fugi Saratoga, 18 spd touring bike w/computer,

profile aerobars. Kryptonite locks, access, \$400:

#### Trakstand Performance trainer, \$100, 482-0888. **Audio Visual & Computers** Sega Genesis w/3 controllers, \$90; 15 Sega games,

\$20 ea 554-4946

Macintosh Performa 405, w/SW pkg, 14' color monitor, kybd, mouse, modem, \$550 obo; 14.4 fax/modem for Mac, \$70 obo. 326-5184. Yamaha stereo sys w/dbl dr oak cabinet, \$375 obo.

Satellite recvr/descrambler, Tractor V, satellite disk

& controller, \$250, 337-4182. Mac IIx 8/80, 15" Radius Pivot color mon, ext kybd, mouse, \$450 obo. Carl, x32563 or 527-8947.

Mac Performa 450, 25 MHz, 4 Mb RAM, 512 NB HD, 14" color monitor, kybd, 1.4 Mb FD, ex cond, \$600. 244-1791 or 488-1326.

Mac Classic, intern 40Mb HD, 4Mb RAM w/ext kybd, \$200; Apple Imagewriter, \$25; Apple Stylewriter II, \$50; case, \$25, all ex cond; Bubble Shaft driver, 80reg flex, \$150. Ken, 473-2602. Packard Bell 386 SX16, 4Mb RAM, 105 Mb HD, 14\*

VGA monitor, Panasonic KXP 1124 24-dot pin matrix printer, Dos 6.22, Windows 3.11/MS Works, \$300 obo. Curt. x41065 or 326-2866.

Macintosh Power PC's, several to choose form, details/prices. Bobby, 244-2444 or 488-4382. Sony car Discman w/remote & ESP, \$100/ Thanh,

HUSH I.S.P, single-ended noise reduction sys, uses compression & dynamic enhance automatic & manual oper, std 19" rack mount, \$175. 776-9754.

Two stereo speakers, shelf sz, KLH, ex cond, \$25 both. Mike, 333-2335. Epson action Laser II printer, \$360 obo. x35590 or

Technics 5 Disc CD player, \$75, 538-3431 Sega game sys w/case, adapt, magnifier & 7 games, \$150; Jungle Strike game for SNES, \$35. Ron,

Nintendo game system, \$25 obo. 280-9740. 486 DX 2/80 MHz motherboard w/AMD processor, \$100 obo; Panasonic 24 pin color camp, dot matrix printer, \$25. Jon or Elizabeth, 286-5002.

Stylewriter printer, Mac, 360 dpi, ex cond, \$95.

### **Musical Instruments**

Lowrey Festival organ, \$600. 326-1775. '78 Gibson Les Paul, blonde, hard case, good cond.

Sigma-Martin 6-string guitar w/case, stand, books, \$500. Wendell, x39421 or 286-9892.

#### **Photography**

Meade 8\* Reflector Telescope w/finder scope & motor drive, extra eyepiece/filters & access, ex cond, \$700, 585-4268.

Nikon F4s, ex warr, mint cond, S1.6k. John, x36136 or 286-2850

#### Pets & Livestock Siberian Husky pups, m/f, AKC champion sire, shots,

rocker/recliner, \$250. 326-4662.

ready now, \$275-\$300; Great Pyrenees, male, neutered, current shots, \$100. Lisa, x40113 or 992-7302 Golden Hair Tarantula, huge w/agua, \$20, x38785.

Cocker Spaniels, female, red/white, sm, show quality, \$100. Bob, x33057 or 538-3431. Household Kenmore compact stacked W/D, \$250 obo; 8-5pcs

place settings of Pfaltzgraf "Aura" w/service pcs. \$60

Wht contemp qn hdbd, 2 nite stands, drssr, \$250; wht wicker rocker & table, \$20 ea; sleeper sofa, SW colors, \$150; 2 armless chrs, \$25 ea; La Z Boy swivel

5 pc dining room set, table 1/leaf, chairs roll, swivel & rock, \$275. Kathy, 337-5622. Kg sz matt/springs/frame, good cond, \$100. 244-

Semi-motionless kg sz waterbed w/frame & heater,

\$200, 337-5583.

Sofa & loveseat, off-wht SW style weave, ex cond, \$325; coffee tbl & 2 end tbls, wood const w/storage cabinets each pcs, \$200. x334538 or 286-7484. Whirlpool gas dryer, white, ex cond, \$250 obo.

Brian, x32635 or 480-4351. Sofa, beige, ex cond, \$225. x39527 or 538-3483. 2 lg oak consoles, 31"x67", \$200 ea; 2 hortz blinds, dusty rose, 78"x80", \$40 ea. 282-3570 or 474-3820.

Kg sz waterbed w/matt/frame, lg mirrored hdbd \$150. 283-4284 or 488-4028. Ethan Allen dining tbl & 4 English Windsor chairs, 42"x32"x29.5", opens to 108" w/2 leaves, southern oak, addt'l pcs avail, \$1,995 obo. Bill, 526-7707.

Kenmore W/D, good cond, electric, \$180 set. Louise, 282-7343. Kenmore, white, W/D, \$100 obo. Merri, x34470 or

Blue/beige sofa & loveseat, fair cond, \$100, 554-

Off-white sofa, good cond, \$300. Kari, 282-9366. BDR set twin beds, hdbd, ftbd, boxsprings, 2 dressers/2 nite stands, wht w/gold trim, good cond, \$375; entertain center, dk wood, ex cond, \$75. x47980 or 554-7693.

#### **Want Ads**

Want non-smoking roommates to share 3-2-2, Webster, \$340 mo includes all utile, except phone,

Want roommate to share 3-2-2, Pasadena, smokers ok, \$350 mo, Tamela, x36155. Want non-smoking housemate to share, 3-2-2,

w/bath & garage, Bay Glen, CLC, \$335 mo + \$200 dep. 1/2 utilities. Larry, x33168 or 488-7460. Want non-smoking, male, roommate to share 2-2

townhome in Pearland, \$350 mo + 1/2 utilities. John, Want non-smoking housemate, 3BDR, Kemah,

\$300 mo + 1/2 utile. Mark, x39527.
Want housemates, 2 BDR avail, share bath, pool & jacuzzi, \$325 + 1/4 utilities, non-smoker. Ken, x31496 or 286-7583

Want roommate to share 3-2-2 home. Clear Lake. \$365 mo + 1/2 utilities. Robert, x36402 or 286-0434. Want VCR w/ability to program/copy tapes, need until to 11/96. Laurie, x39593 or 474-1455

Want reg Cocker Spaniel, f, to breed w/reg m Cocker Spaniel 456-8445 Want 10 gal fish tank w/wood stand, pump & filter, no veneer. Sharon, x38506 or 480-2646.

Want 19 color TV w/remote, \$60/less; sm microwave. \$75/less good cond; sm personal refrig \$75/ less all for a dorm, need 8/12. x36747.

Want your non-working mower/edger, x31883 Miscellaneous

Wht bathroom sink, 31" W & cabinet, 27.5"W, \$35. Pop-up camper, good cond. A/C, new tires, \$2k. Jim, x30411 or 480-2646.

Train set. 4x8 tbl, track, lots of access, 332-3168. Desk, gray steel, \$50; pedestal tbl. mar proof, 4 barrel back/swivel, chairs, \$115; wood music console w/spkrs, \$100\_x35804 or 474-5610

Bench drill press, 1/3Hp, 5 spd, .5" chuck, adj tilt/ht tbl, ex cond, \$90; baby cradle w/bedding, great cond, \$60; baby changing tbl, \$35. x35761 or 480-6557.

Motorcycle tire, 3.00-17, tube type, \$15; pool filter valve/valve body. Hayward SP-710, \$25; HO tracks, many misc pcs, \$15; car top carrier, 2-bar, rubber pads, \$15. Gary, x47566

20 gal aquarium, tank only, \$25. Bob, x33057 or Pistol case, fits 2-3" barrel revolvers & sm/med

autos, \$6; Eureka dome tent, sleeps 3, ex cond, \$60. Jim, x30411 or 480-2646. '93 Wilderness Travel, upgrades, slide out living area, on bed, solid oak inter, \$15.5k, Jack, 326-2865. Ariens 38" riding mower, Briggs/Stratton eng, elect

start, main records, \$650 ob; Peugeot women's racing 10-spd, \$55; Schwinn classic mens 3-spd w/chrome fenders, \$15. Paul, 333-7369. Mauser 9MM, model 90 dbl action, semi auto w/de-

cocker safety, 2 14 rnd mag, blue finish w/hard wood grips, ex cond, \$450. Jim, 991-0533.

Hot tub/spa, 4 person, 6' rnd redwood, surround, ex cond, \$900. x31025 or 996-1965. Girls' bike, 20", \$30; skateboard, \$50. Mike, x34710. 6 drwr oak dresser w/mirror, \$200; men's single spd bike, \$30; motorcycle helmet, \$20; wicker bookcase, \$50; Comanche LT 235/75 R15 radial tires, 2, ex cond, \$100 both, 332-2453.

Miyata 618GT 18 spd touring bike w/computer. Scott aerobars, Kryptonite locks, access, \$400; Winchester children's trailer, \$125, 482-0888. Seated diving buoyancy compensator, Ig. obo. Ron.

Child bike seat up - 35', \$15; Home Design CD-Rom, \$15; Megarace CD-Rom, \$10; full sz Lion King sheet set, \$10, twin sz Toy Story sheet set, \$10. x37130. 2 indiv AstroWorld/Water World season passes.

x48200

\$46 ea. x34842 or 474-7982 Hydro drafting brd, 6', \$550; Ig photostatic camera/ enlarger, \$850 obo, both great cond. 486-8805.

Olympia Seahorse spa, 500 gal clover/lounge, sits 8. 8' x 41", ex cond, \$2.2k, 337-4182 Bassett baby crib w/matt, oak, \$80; manual multiaction treadmill, ex cond, \$125. Chris, 486-5787. Deluxe Lawn Boy mower, ex cond, \$300. Mike, 333-

File cabinet, 4 drwr, \$35; Evenflo child's bed, \$35; law library, \$400. x33084 or 286-2235.

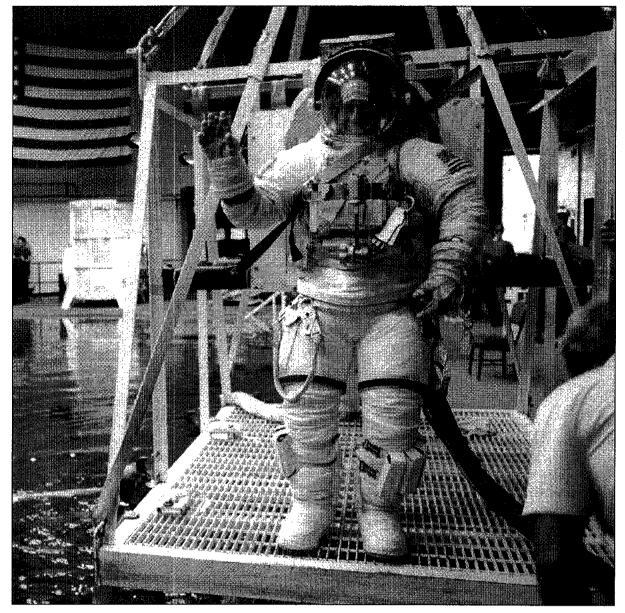
Diawa graphite shaft golf clubs, 1/3/5 metal woods. 3-PW Irons, ex cond, \$475. 333-9113. Sculptured art, 1 of kind, Porcelain angles, "Alpha &

Omega", \$200; wall sculpture hand painted w/oils "Plato's Parable", \$175; hand painted figurine "Xanadu" \$80. sherman, 337-2590. Antique 32 cal revolver, 5 shot, blk handles, for

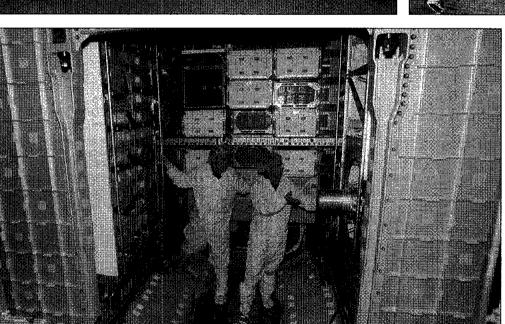
more details, obo over \$100. J. Dornbach, 326-3459. Icom MT Marine transceiver, \$155; Mantis tiller/cultivator, \$175. 326-1775. Pick-up truck camper, incl sink, stove, icebox, \$350. 479-3593 or 338-7940.

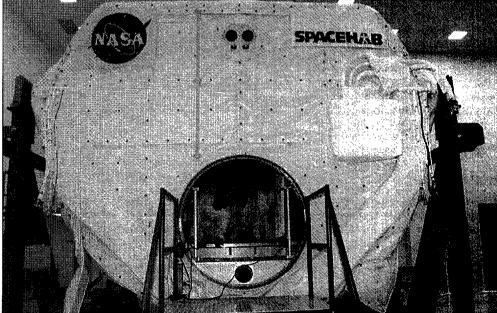
Girl's 12" bike w/trng wheels & basket, \$12; Fisher Price adj roller skates, \$6; Century infant car seat/carrier, \$25; girl's tap shoes sz 10.5 M, ex cond, \$10; Frederick Forsythe books, set of 4, \$5 set; John Jakes books, set of 8, \$10 set. Sharon, x38506 or 480-2646. Stanley garage door opener, \$50; RCA video camera & VCR, \$50; hi freq pwr supply, \$25; record play-

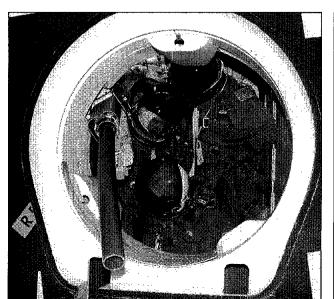
er, \$20; tapes, 5" - 7" reels, .50 ea. 474-5610. VitaMaster stationary, incl monitor for dist/spd & calories/time/odometer, \$200 obo. 332-9094.

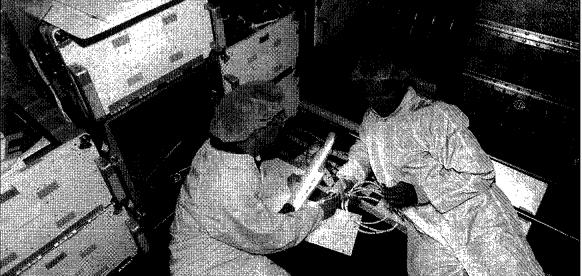












# Team Training

## STS-79 crew spends hours preparing for link up with Mir

he STS-79 mission, set to lift-off in September, will carry an experienced crew of six that have spent the majority of its time training for the fourth shuttle docking to the Russian Mir Space Station.

Commander Bill Readdy, Pilot Terry Wilcutt and Mission Specialists Tom Akers, Jay Apt and Carl Walz, along with Cosmonaut Researcher John Blaha, trained at the JSC Weightless Environmental Training Facility and Kennedy Space Center's Payload Processing Facility to prepare for shuttle emergencies and learn the Spacehab payload systems. In addition to training in the states, Blaha spent a majority of his time in Russia preparing to become a member of Mir 22. He returned home recently to participate in another training exercise, the Terminal Countdown Demonstration Test, set for the end of August.

Training consist of a variety of activities. Crew members must learn how to space walk and repair shuttle systems even if there is no planned space walk. They must learn how to bail out of the shuttle's escape hatch and to survive in the water.

Crew members also must learn the systems they will be working with during the nine day mission. The Spacehab module will carry a variety of experiments, equipment and supplies for the Russian outpost and its occupants. Life science experiments

will study the effects of space on crew members-in particular, Cosmonaut Researcher Shannon Lucid, who will return to Earth with the STS-79 crew after a recordbreaking stay on Mir.

Throughout the training, the crew took photos to share. From top to bottom left to right:

1) Apt spends time in the WETF preparing for a space walk. Although no space walk is scheduled for this mission, the crew must be prepared to venture into the cold environment of space to repare shuttle systems.

2) From left, Walz, Wilcutt, Readdy, Apt and Akers practice escaping the shuttle in their ascent entry suits.

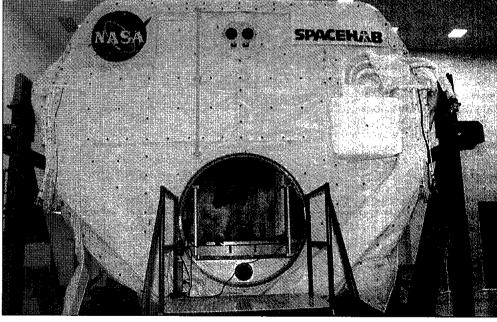
3) Readdy practices water survival training in the WETF in case the crew must abandon a mission over water.

4) At KSC, Walz, left, and Apt examine the interior of the Spacehab module. STS-79 will be the first flight of a double Spacehab and will allow more supplies and equipment to be taken to Mir while still allowing room for scientific research.

5) Chris Jaskolka of McDonnell Douglas, right, shows Walz, left, and Apt the layout of the Spacehab.

6) Walz prepares to help a team member escape the orbiter during crew escape training in Bldg. 9.

7) Apt, left, and Walz check out some of the equipment aboard the Spacehab module.



KSC Photos JSC Photos by Andrew Patnesky, Robert Markowitz

## Houston science museum seeking JSC volunteers

The Houston Museum of Natural Science is seeking volunteers and will be at JSC next month to discuss available opportunities.

"The Houston Museum of Natural Science is very proud to offer one of the most rewarding and exciting volunteer programs in the Houston area," said Claudia Baltodano, recruiter for the museum's volunteer services. "Our volunteer program provides an excellent opportunity for JSC employees to become more involved in helping children and adults nourish their knowledge in science and encourage them to appreciate and love the world around them."

Baltodano will be at JSC from 2-3 p.m.

Aug. 14 in Bldg. 45, Rm. 251 to discuss the volunteer program with interested employees. Some demonstrations, including live animals, will be included in the meeting.

The museum houses the Cockrell Butterfly Center, Burke Baker Planetarium, Wortham IMAX Theatre, the world's first Challenger Learning Center and over a dozen halls of permanent natural science exhibits that the museum hosts each year.

Volunteers work in every area of the museum, from interpreting exhibits for school children and families, to essential jobs behind the scenes. There are a variety of volunteer opportunities available.

Volunteers may choose to work with the public as interpreters of the museum's permanent and temporary exhibits and assist with educational and outreach programs, or choose to be visitor services volunteers. assisting the information desk patrons. Volunteers also may choose to help with special events and fundraising activities, in all areas of planning, organizing and executing the events. Staff volunteers also are needed to work behind the scenes to maintain files, prepare mailings and help to organize and catalog museum collections. Training is provided in all areas.

Aside from the inherent personal rewards

which come from volunteering, employees also will receive museum benefits Baltodano said. Volunteers will receive free parking and two free passes for every 20 hours of volunteer service, a 10 percent discount in the Museum Gift Shop and information on upcoming events.

To learn more about the museum and its volunteer program, employees can visit the museum's web site at URL: http://www .hmns.mus.tx.us:80/hmns/home.html

Employees interested in becoming museum volunteers may attend the Aug. 14 meeting or call the museum volunteer office at 639-4643.

## Disability act marks sixth anniversary

Today marks the sixth anniversary of the signing of the American with Disabilities Act of 1990 and the Equal Opportunity Programs Office is available to help maximize the potential of disabled workers.

This landmark legislation gives civil rights protection to individuals with disabilities, similar to those provided to individuals on the basis of race, color, sex, national origin, age and religion. Several federal statutes have been passed to enhance the opportunities of persons with disabilities to enjoy the benefits and rewards of work.

Among these statutes are two laws of interest to the work force at JSC— the Rehabilitation Act of 1973 and the ADA. The intent of the Rehabilitation Act of 1973 was for the federal government to become a model employer of individuals with disabilities. The ADA was patterned after the Rehabilitation Act of 1973. Both laws provide employees and employers with guidelines to maximize job opportunities and employment potential for employees with

The laws include requirements for employers to make reasonable accommodations to employ and retain qualified handicapped individuals. Such accommodations could involve restructuring the job, modifying work schedules, adjusting or modifying examinations, providing readers or interpreters and acquiring or modifying equipment or facilities. The employer is not required to provide reasonable accommodation if it will impose an undue hardship on operations. The ADA does not require employers to hire anyone who is not qualified. An employee or job applicant may not succeed in claiming discrimination under the ADA unless he or she meets all the requirements of the job and can perform its essential functions.

For more information employees may contact the Equal Opportunity Programs Office at x30601.

#### Correction

A story in the July 19 edition of the Space News Roundup incorrectly identified the In-flight Maintenance Group team members. Members were Jeff Stone, Paul Lloyd, Randy Barckholtz, Victor Badillo, Ronnie Rogers and John Shimp.



EARNED VALUE—Above: **Mission Operations Director** John O'Neill, right, presents Certificates of Validation to, from left, Jay Crutchfield, Ron Gantz and Leroy Hall of Lockheed Martin, formerly Loral, following demonstrations that their performance management systems and management teams are compliant with the cost and schedules control system criteria, also known as 'earned value.'



Right: Hughes-Link also received validation from MOD. From left are, Charlie Floyd of Hughes-Link, O'Neill and Howard Marshall also of Hughes-Link. Earned Value Management is a proven industry best-practice process that provides for improved contract planning and control by integrating contract scope, schedule and cost objectives. Through the establishment of a baseline plan for performance, it provides a sound basis for early problem identification, impact analysis and corrective action as may be required. By emphasizing adherence to approved processes, earned value management facilitates improved communications within each company and with their JSC customers. As a result of their success, JSC now has improved cost and schedule visibility on two major MOD contracts. JSC Photo by Mark Sowa

## Discovery returns to fleet; '97 mission will service Hubble

(Continued from Page 1)

flight of the large science module. The double module provides more room for experiments and supplies for the Mir-22 crew.

Meanwhile, Columbia is in the Obiter Processing facility at KSC undergoing preparations for STS-80-the third flight of the Wake Shield Facility. Engineers are preparing to test Columbia's fuel cell voltage. The flash evaporator system was flushed this week and technicians will remove and replace an auxiliary power unit today. The impact of the solid rocket booster swap on Columbia's launch date is continuing to be

Elsewhere, technicians are beginning work on Discovery, just returned recently via ferry flight from a modification period in Palmdale, Ca. Discovery's next mission is planned to be STS-82 in early 1997, the second Hubble Space Telescope servicing mission. Also, preparations are in work for Endeavour to be transported to California for its maintenance period. Upon its return from Palmdale, Endeav-Space Station mission in 1997.

## **JSC team receives** honorable mention

JSC's Electronic Documentation Project Software Development Team took home honorable mention in the third NASA Software of the Year Award competi-

The 12 member team developed software that will provide an electronic capability to distribute, display and control changes for crew/ground controller procedures and documentation. The EDP System will include the functionality provided by the current paper based system, but in an electronic format. This system will be available in the office, control center and in training instructor facilities. In addition, the EDP System will build on the paper process with hypertext extensions. The electronic system will reduce the cost of maintaining the current paper-based method of operations. The system also will improve the efficiency and provide enhanced flexibility in document usage, supplement and ultimately replace the paper documents and provide NASA-wide access to Mission Operations documents.

The Software of the Year Award winners were Linked Windows Interactive Data System, or LinkWinds, developed by the Jet Propulsion Laboratory and the Tetrahedral Unstructured Software System, or TetrUSS, developed by NASA's Langley Research Center, LinkWinds software will help scientists better examine geophysical and climatological data. TetrUSS provides solutions to aerodynamic problems in designing new aircraft.

NASA will present the awards at the Technology 2006 Conference to be held in Anaheim, Calif., in October. Recipients will receive a plaque and a substantial monetary award.

## Symposium calls for technical papers

The 31st Aerospace Mechanisms Symposium, planned for May 14-16 at Marshall Space Flight Center, will focus on the problems of design, fabrication, test and operational use of aerospace mechanisms.

The program will emphasize hardware developments. Informative and thought-provoking papers pertaining to mechanisms technology are now being solicited for the symposium.

Papers should describe fully-developed, tested and/or flown space or aircraft mechanisms and should contain essential design details and also unique requirements and other factors of interest to engineers developing flight hardware. Authors are encouraged to discuss anomalies that have occurred and thus help others avoid similar problems in the future.

Papers for presentation are selected on the basis of summaries of approximately 1000 words and must include the principal results of the investigation, along with the scope and status of the work.

Summaries must be submitted by Sept. 6 to Edward Boesiger at Lockheed Martin Missiles and Space, P.O. Box 3504, Orgn. 73-15, Bldg. 150, 1111 Lockheed Way, Sunnyvale, Calif. 94088-3504. Employees also our's next flight will be the first International may call 408-743-2377, or email at boesiger ed@mm. ssd.lmsc.lockheed.com

## Lucid writes home about Mir space walking activities

(Continued from Page 1)

their backs. I told them that you can only take pictures of what you can see. We named that video "Cosmonaut Spines." Although I cannot see everything, I can hear the entire EVA. Several times during a night pass I have been watching them work in a small flat pancake of light out on the end of some module and have heard them muttering about the mamas and the papas—the Russians use these terms instead of "male" and "female" for electrical connectors-as they work on connecting a payload to station power. It all feels warm and homey.

After five hours of intensive work. it is time to think about coming back inside and Yuri rotates the handle that controls the long pole, swinging the other Yuri through space on the

end of this cosmic "fishing pole." Yuri and Yuri then enter the airlock and begin the process of repressurization. After what seems like a long time, and after many requests for me to read them the station pressure, the airlock opens and they suddenly appear in the base block looking like two excited young boys that have just completed a great adventure. They immediately watch the video I have taken and excitedly discuss each event while drinking the hot tea or the tube of juice I have waiting. Unfortunately, even the best plans sometimes go wrong. After the last EVA, I had what I thought was Yuri's favorite juice. He eagerly grabbed it with a smile of thanks, which immediately turned into a horrible grimace as a glob of catsup squirted into his mouth. Yes, I had

mistakenly gotten the wrong tube. They all look pretty much alike. My language skills are not quite at the level that I could convince him that I

should at least get points for trying. Before the first EVA that occurred while I was on Mir, Yuri and Yuri joked about what I would be doing while they were outside, saving that I would be the "commander" of Mircommander by virtue of being the only person inside the station. They jokingly agreed with each other that I would have a large American flag hanging in the base block to greet their return. Well, no, I did not hang up the American flag. I wasn't sure how far to stretch their sense of humor, but I did make one command decision. For several weeks we had been eating what was left in the food containers and not opening any new ones. As you might guess. the selection we had was not any of our favorites; that is why it was left. Being in command, and feeling very much like Captain Kirk, I knew that the first prerogative of a good commander is the welfare of her troops, so I decided to open a new container and have their favorite meat and potato dish warmed up and ready for them upon their return. Eating it with gusto after the EVA, neither one asked where it had been found. All they said was, "Thank you so much."

After our meal, it is off to bed. We wake up refreshed and begin talking about the next EVA later in the week. And I begin fantasizing that maybe this time the guys will invite me to go out with them. Yes, the stars are always brighter on the other side of the hatch.

# **Space News**

The Roundup is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

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Electronic mail messages should be sent to the editor, khumphri@gp301. isc nasa dov or the associate editor, kschmidt@gp301.jsc.nasa.gov.

Editor . .Kelly Humphries Managing Editor .... .Karen Schmidt Associate Editor. ..Natasha Calder